

A Biographical Dictionary of Architects in Maine



Amos D. Lockwood
1815-1884

Textile mills have long dominated the architectural character of Maine's cities and towns. Large brick complexes in Lewiston, Biddeford, and Saco were erected beginning in the 1840s and enlarged over the years as plant capacity kept pace with the expanding textile industry. Little research has been done on the men who designed these mills, in part because the design and construction of a textile factory often involved the input of several different trades.¹ It was not until the latter half of the nineteenth century that the profession of mill engineer evolved. Unlike the

construction of residences and commercial blocks, considerations such as machinery, motive power, and the capacity for future expansion of the plant entailed planning more complex than the structure itself. Amos D. Lockwood, whose career as an engineer found fruition in Maine, was one of the first men in the country to establish a profession as a mill engineer in terms of one who could provide all of the services necessary to design and build an efficient textile factory.

Amos Lockwood's life offers an outstanding example of a self-made man who acquired the training and expertise necessary to establish himself as an authority in his field by working in a mill and thereby learning all about the manufacture of textiles. He was born in 1815 in Pawtucket, where his father worked as a civil engineer and surveyor. At age sixteen Amos went to work in a store that was associated with a cotton mill in Rehobeth, Massachusetts. Two years later he was working in the factory itself as an operative. In February, 1832, Lockwood moved to Slaterville, Rhode Island, to work as an assistant supervisor of the Almy, Brown & Slater Mills. This advancement was no doubt assisted by the fact that Lockwood's grandmother had married Moses Brown, who, along with William Almy, had built the first textile mill in America in 1793. In 1835 Lockwood was appointed resident agent by Samuel and John Slater, who had purchased Almy and Brown's interests. In his capacity as agent, he served as manager of the mills. Eight years later, in 1843, Amos, his brother Moses, and brother-in-law Rhodes Chapman formed the firm of A. D. Lockwood & Company and leased the mill for ten years. The company Lockwood formed apparently was organized to manage and operate the mill rather than perform engineering services.²

A. D. Lockwood & Company took on the management of another mill in 1851 when the firm purchased controlling interests in the Quinebaug Company in Danielson, Connecticut. The textile plant included a new mill building which had not been put into operation. Lockwood later enlarged the plant with a new mill in 1853-54. According to the principal biographical account of his career, he gradually became more

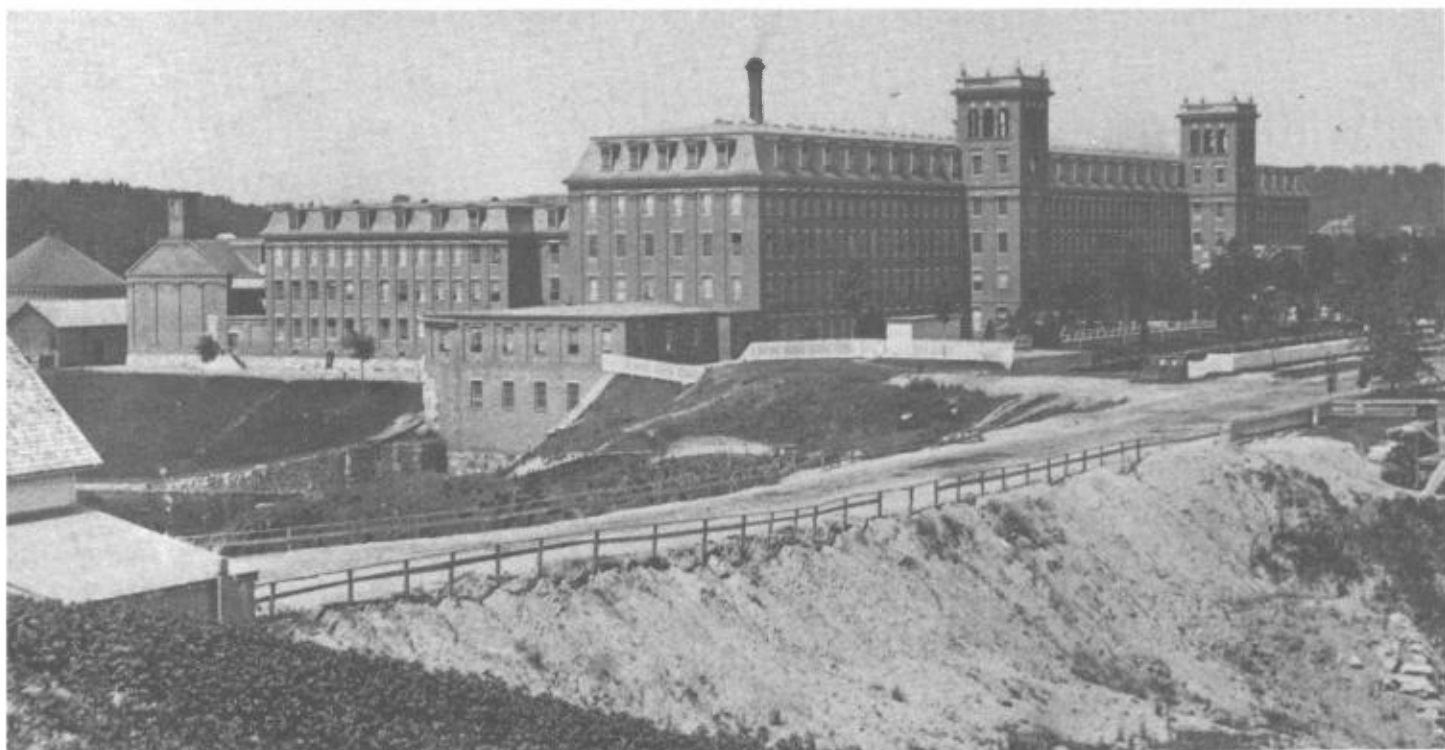


Figure 1. Androscoggin Mill, Lewiston, circa 1875 view (MHPC).

interested in engineering problems when he was hired to make improvements to the Pacific Mills in Lawrence in 1853. This massive mill complex, the largest in the country at the time, brought Lockwood into direct contact with the Boston entrepreneurs who financed so many of the early textile mills in New England. This connection no doubt led to his being hired to replace David Whitman in 1858 as mill engineer for the Franklin Company in Lewiston, a largely Boston-owned consortium. Lockwood also took over Whitman's duties as consulting engineer for the Pepperell and Laconia mills in Biddeford. David Whitman, who died in 1858, was one of the first consulting engineers in New England.³

With large investments in capital necessary for the rapidly growing textile industry by the 1850s, it had become increasingly important to hire professional engineers to provide planning and design services. The earliest textile mills were wood or stone buildings constructed in a traditional manner to satisfy a limited production capacity. By the 1840s, however, large mills were built of brick as the most economical material to both support the weight of new textile machinery and allow for additions and modifications of existing plants without major structural changes. The need for engineering expertise was reinforced after the collapse of the Pemberton Mill in Lawrence in 1860. Constructed in 1853, this factory had exceeded standard dimensions for mill design in a way that proved fatal due to the imperfections in the casting of the iron columns supporting the floors.

This tragedy probably prompted investors to take a more conservative approach in mill design for the next half century.⁴

The expertise of men like Amos Lockwood was called upon for several critical factors in mill design. First, there was a need to evaluate the site for its water power potential and its ability to provide secure footings for the mill building. This would have to be done in terms of an analysis of the potential for future expansion as well. The standard mill design as it had evolved in the 1850s consisted of a four or five story brick structure with a gable roof and an exterior stair tower. The walls of the mill had three to four foot wide pilasters between the windows to provide extra thickness to carry the weight of machinery and withstand vibrations. The windows consisted of multi-pane sash for easy replacement of broken glass and had flat lintels. Cast iron columns were commonly used to support the floors until the Pemberton Mill disaster when heavy timbers, usually 9 feet by 9 feet or 9 feet by 8 feet, became standard. The use of wood for columns and floor joists provided a measure of fire protection in terms of their ability to suffer prolonged exposure to flames without losing structural integrity. By the 1860s gable roofs were also discouraged, because attic spaces used as storage areas acted as fire traps.⁵

The structural evolution of textile mills coincided with changes in architectural fashions as well. With pilasters and gable roofs, the mills of the 1840s and 1850s adopted decorative details characteristic of the



Figure 2. Androscoggin Mill, Lewiston, circa 1875 view (Courtesy of Society for the Preservation of New England Antiquities).

Greek Revival style. When gable roofs were replaced by flat roofs (actually hip roofs with an almost imperceptible pitch to shed water), overhanging eaves were supported by brackets in the newly fashionable Italianate style. Alternatively, a mansard roof could be substituted for the upper story since that type of roof also eliminated attic space. The exterior stair towers could be ornamented as little or as much as budgets allowed. The Greek Revival style pilasters were gradually eliminated by making the sections with windows flush with the exterior surface so that the additional wall thickness on either side, which had suggested pilasters, was on the inside. At the same time, more fashionable segmental arches were substituted for flat lintels.⁶

Two years after replacing mill engineer David Whitman in Lewiston, Amos Lockwood was hired as Agent for the Franklin Company in Lewiston. Under Lockwood's direction the new Androscoggin Mill was built in 1860 (Figures 1, 2). The construction of this building provides a good illustration of the various trades involved in designing a mill without the participation of an architect. Although architecturally imposing with its mansard roof, the design lacked the sophisticated ornamental treatment normally associated with that style. The brick walls with their rows of pilasters and square headed windows were standard mill design, while the dormer windows in the mansard supported only minimal architectural moldings. Even the bell tower with its round arched windows and roof balustrade lacked the ornamental complexity commonly employed for the chief decorative feature of a mid-nineteenth century mill. An account given at the time credits the following individuals with the construction of the Androscoggin Mill: "Mr.

A. D. Lockwood has had the general supervision of all operations; Capt. A. H. Kelsey has erected the buildings; E. Studley has been chief brick layer, Jesse Stevens chief carpenter, while Josiah Brown has draughted the buildings and machinery throughout."⁷ It can be deduced from what is known about Lockwood that he was responsible for all of the planning and design work, but that the actual construction drawings were executed by Josiah Brown, an employee for the Franklin Company. Captain Kelsey was the clerk of works for the mill owners, being responsible for ensuring that the work was completed on time and in accordance with the plans. His previous experience in mill construction must have been exceptionally helpful as well.⁸ Lockwood's involvement in projects such as this must have provided him with the idea that to form an engineering consulting firm which could provide all of the essential services from site planning to the design and installation of machinery and the supervision of construction of the mill, would be invaluable for investors planning new textile manufacturing.

As Agent for the Franklin Company, Amos Lockwood's activities extended beyond the construction and operation of the mills. The company was also the principal land owner and developer of Lewiston, and the Agent's duties included activities associated with local improvements in town. For example, Lockwood oversaw the construction of a park in the center of town and the enlargement of the company-owned DeWitt Hotel. In the years immediately following the Civil War, he was involved in projects having more to do with administration and planning than with design. In 1866 he served on the board of directors of the new Worumbo Mill



Figure 3. Lewiston Mills, Lewiston, altered in 1864 by Amos D. Lockwood, circa 1875 view (MHPC).

Corporation which erected a mill in Lisbon Falls, then travelled to England for four months to inspect the latest textile machinery. To provide design services for remodeling the DeWitt Hotel, additions to the Androscoggin and Lincoln mills, and the construction of the Lincoln Boarding House Block, Lockwood relied on the Franklin Company's new architect, William H. Stevens.⁹

Lockwood's financial investments, either as an agent of the Franklin Company or on his own, are complex and beyond the scope of this study. For example, it can be noted that while in Maine Lockwood served as President of the First National Bank of Lewiston and of the Maine Central Railroad. Suffice it to say that his knowledge of financial matters in general led to his advancement not only as an expert in the design of mills, but in raising capital and directing the operations of new corporations. This resulted in the next major phase of his career when, in 1871, he resigned as Agent for the Franklin Company and moved to Boston to form a new firm, A. D.

Lockwood & Company. A partner in this company was his brother-in-law, John W. Danielson. The death of his brother Moses in May of 1872 caused Amos Lockwood to relocate to Providence to be closer to the family's mercantile interests. The company moved to Rhode Island a few years later.¹⁰

Lockwood's firm prospered in large part due because it expanded both consulting and investment activities beyond New England. A. D. Lockwood & Company led the effort to establish the textile industry in the South. The Piedmont Manufacturing Company Mill in Piedmont, South Carolina, built in 1873, is considered a prototype for many of the factories later built in that region. Lockwood's vision of a firm of mill engineers as developers is exemplified in Maine with the construction of the Lockwood Mills in Waterville (Figures 4, 5). As a large subscriber, treasurer of the company, and chief designer of the mill, the new textile plant was named in his honor.

Surviving drawings for the Lockwood Mills provide documentation of the engineering firm's



Figure 4. Lockwood Mills, Waterville, circa 1885 view (MHPC).

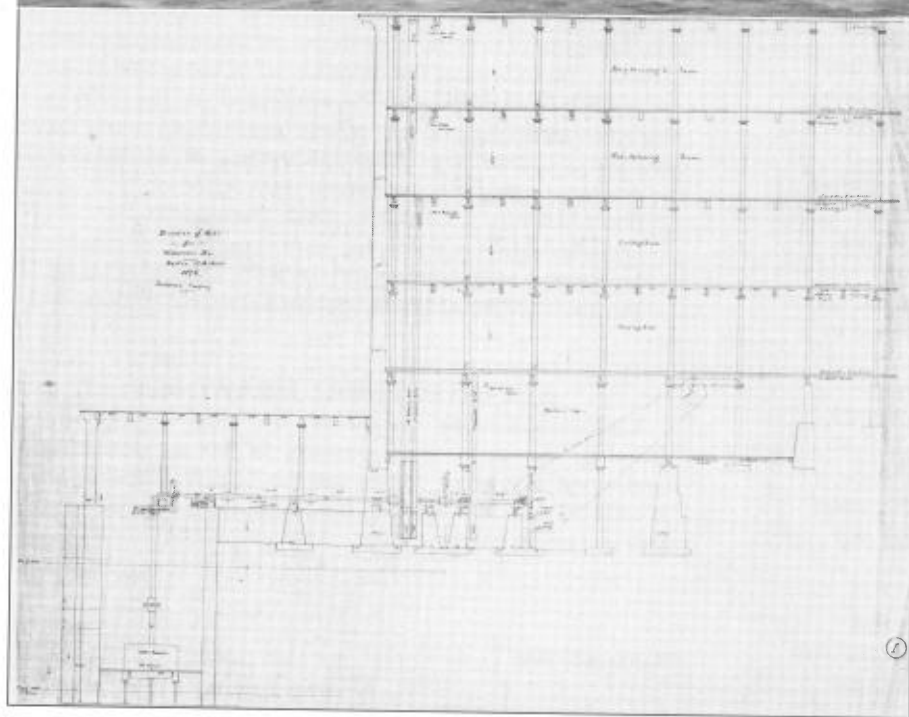


Figure 5. Cross section drawing of the Lockwood Mills, Waterville (Courtesy of Lockwood-Greene Engineers, Inc.)

approach to mill design.¹¹ These working drawings are masterpieces of economy. No full elevations were prepared for the exterior. Rather, there are large sheets with details showing typical doors, windows, arches, and foundations, it being a simple matter to fill in the brick walls during construction. Of course, dimensions in plan and wall thickness were also provided as well as framing plans for floors and the roof.

The only fully detailed plans and elevation drawings were in the layout of the machinery and the arrangement of the belt drives for motive power. Although designed in the Italianate style, the exterior was ornamented only in the bell tower with its decorative balustrade.

Constructed in 1874-75, the Lockwood Mill was a major industrial enterprise for Waterville. The project included the construction of a gas house and mill race as well as worker housing on nearby lots. Recognizing the size of this undertaking, the Lewiston contractors established a

brickyard across the river in Winslow to have a ready supply of bricks. A second mill was built in 1881-82, doubling the capacity of the operations.

Among the many business associates of Amos Lockwood, none was more important than Stephen Greene, who came to work for the company as a draftsman in 1879. By 1882 Greene's abilities were such that Lockwood formed a new partnership,

Lockwood, Greene & Company. As stated on the firm's letterhead, they provided, "Carefully prepared plans, specifications and estimates furnished for the construction, equipment and organization of new mills and the revision and improvement of old." Greene, only thirty years old when he became a partner, provided the energy and drive to launch the new company. Lockwood's son-in-law, John W. Danielson, was the third partner and handled financial affairs. Lockwood, Greene & Company continued after Amos Lockwood's death on January 13, 1884, and operates to this day as Lockwood-Greene Engineers, Inc., one of the nation's leading engineering firms.¹²

Roger G. Reed

NOTES

1. The best overview of textile mill design is a dissertation by Betsy W. Bahr, "New England Mill Engineering: Rationalization and Reform in Textile Mill Design, 1790-1920", University of Delaware, 1987. Much information on New England mill engineers can be found in *Lockwood Greene, The History of an Engineering Business, 1832-1958* by Samuel B. Lincoln, Brattleboro, 1960.
2. The principal biographical account of Lockwood's career is Lincoln's *Lockwood Greene*, op.cit. An earlier source is *New England Manufacturers and Manufactories* by J. D. Van Slyek, Boston, 1879, Vol. I. Both sources are uncritical.
3. *Lockwood Greene*, op. cit., contains a lengthy account of Whitman's career as the first "mill doctor."
4. Bahr, "New England Mill Engineering", op. cit., pp. 66-80.
5. The standard principles of mill construction in the second quarter of the nineteenth century are outlined in Charles T. Main's "Notes on Mill Construction," *Proceedings of the Semi-Annual Meetings of the New England Cotton Manufacturers Association*, October 27, 1886, No. 41.
6. This explains why all of the mills constructed in Biddeford, Saco, and Lewiston during the 1850s were remodeled to eliminate gable roofs in the 1860s and 1870s.
7. *Lewiston Journal*, October 25, 1860.
8. Albert H. Kelsey (1811-1901) was a contractor and builder who resided in Cambridge and worked all over the country. During the 1850s he was the agent and building contractor for the Franklin Company and its predecessor the Lewiston Water Power Company. In that capacity he laid out the streets and built both the canal and the early mills. Like Lockwood, he acquired an expertise in hydraulic engineering. Kelsey's knowl-

edge of engineering must have come later in working with David Whitman as his training prior to working in Lewiston was as a carpenter-builder. For two lengthy accounts of Kelsey's career see "Albert Hannibal Kelsey", *Biographical Sketches of Representative Citizens of the Commonwealth of Massachusetts*, Boston, 1901, pp. 395-97 and "Builder of Lewiston", *Lewiston Evening Journal*, March 4, 1901, p. 2.

9. Roger G. Reed, "William H. Stevens 1818-1880", *A Biographical Dictionary of Architects in Maine*, Vol. VII, 1995.
10. The Boston fire of 1872 destroyed the company's records, which makes it difficult to document Lockwood's work prior to that date.
11. The present firm of Lockwood-Greene has a large collection of drawings dating back to the mid-1870s. Unfortunately, the only drawings of Maine projects done while Lockwood was alive are for the mills in Waterville and Lisbon Falls.
12. Mr. Stephen A. Parris of Lockwood-Greene Engineers, Inc., has been very helpful in providing assistance with this project.

MILL BUILDINGS IN MAINE DESIGNED UNDER THE SUPERVISION OF AMOS D. LOCKWOOD

Note: The destruction of Lockwood's records in the Boston fire of 1872 makes it difficult to document his role as a designer of new mills or in the modification of existing plants. The following list includes all of the major projects for which Lockwood can be attributed as the principal designer. Although he served as consultant in many more mill projects, his role as principal designer is problematical.

Androscoggin Mill, Lewiston, 1860, Altered.
Bates Mill No. 3, Lewiston, 1863, Destroyed.
Lewiston Mills, alterations, Lewiston, 1864, Altered.
Lockwood Mills, Waterville, 1874-75, 1881-82, Extant.
Worumbo Mill, addition, Lisbon Falls, 1882, Destroyed.

ARCHITECTURAL DRAWINGS

Lockwood-Greene Engineers, Inc., has original linen drawings for only three projects in Maine done while Lockwood was alive. These are the Lockwood Mills built in 1874-75 and 1881-82, and the additions to the Worumbo Mill in Lisbon Falls.

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